APPENDIX VI

HOWE SOUND ECOSYSTEM MAPPING
EXPANDED LEGEND FOR THE
COASTAL WESTERN HEMLOCK (CWH)
BIOGEOCLIMATIC ZONES, SUBZONES AND VARIANTS

Complete accounts for each map unit found in the study area are presented below within the expanded legend (Appendix VI). A description of each ecosystem includes a site description, assumed modifiers, site characteristics, photographs and plot reference numbers. These descriptions are specific to the study area for CWHxm1 and CWHdm. No plot sampling occurred in the CWHvm2 because almost all of this variant was on Crown Land, therefore legend information is limited to general descriptions.

For all forested units in the study area (expect CWHvm2 ecosystems) characteristic plant species and landscape position for each ecosystem are described by common site observations. Site descriptions also rely on background information from Vancouver Region Field Guide (Green and Klinka, 1994) as well as interpretations from aerial photography.

Non-forested and sparsely vegetated ecosystems are described based on a combination of plot vegetation data and background information, but not separated by structural stage. Anthropogenic units are defined based on the Standards for Terrestrial Ecosystem Mapping in BC (RISC, 1998) in association with field observations specific to each unit in the study area. Background information for classifying ecosystems was based on the Vancouver Region Field Guide (Green and Klinka, 1994) and Wetlands of BC (MacKenzie and Moran, 2004). It must be noted that some ecosystems had very few plots, which limits the ability to describe plant species lists for each ecosystem.

Ecosystems that occur in Howe Sound are accompanied by a distribution map. The distribution maps depict the presence of an ecosystem within a polygon. It should be noted that the ecosystem is not necessarily the dominant ecosystem type within the polygon.

Ecosystems in the CWHxm1 and CWHdm subzone

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
CWHxm1/HK **CWHdm/HM**	**Western hemlock–Douglas-fir–Oregon beaked moss** **Hw - Flat moss**	**01**

SITE DESCRIPTION

The 01 site series in the CWHxm1 and CWHdm occurs typically on gentle slopes, with medium textured soils. This 'zonal' ecosystem is the matrix forest community in Howe Sound and is represented at all elevations, on most slope positions, soil depths and aspects. Western hemlock occurs as the dominant trees species in association with Douglas-fir and western redcedar. Western hemlock occurs in all layers of the tree canopy including regeneration layers. The understory is well developed with shrubs such as dull Oregon grape and red huckleberry with lower abundance of salal. Oregon beaked moss, flat moss, and other feathermosses and are present on the forest floor.

Assumed modifiers: d, j, m (CWHxm1/HK); **d, m** (CWHdm/HM)

SITE CHARACTERISTICS

Elevation (m):	0-650
Slope (%):	Variable
Aspect (°):	Variable
Surficial material:	M, F^{G}
Drainage:	m-w
SMR:	3-4
SNR:	A-C

Plots:
H1985A, I1715, I1892A, I1907A, I1987, JCG01, JCG31, JCG83, JCG86, JCG94, JCG134, JCV03, JCV06, JCV07, JCV08, JCV10, JCV12, JCV13, JCV17, JCV19, JCV20, JCV28, JCV32, JCV33, JCV35, JCV36, JCV39, JCV40, JCV41, JCV50, JCV53, JCV55, JCV56, JCV64, JCV66, JCV67, JCV68, JCV69, JCV71, JCV72, JCV82, JCV84, JCV85, JCV87, JCV88, JCV89, JCV90, JCV91, JCV92, JCV95, JCV97, JCV102, JCV103, JCV104, JCV107, JCV111, JCV124, JCV125, JCV126, JCV127, JCV128, JCV132, JCV135, JCV136, JCV138, JCV141, JCV147, JCV149, JCV150, JCV151, JCV152, JCV154, JCV159, JCV163, JCV165, SM2, SM3, SM5, SM9, SM14, SM16, SM17, SM18, SM20, SM21, SM29, SM31, SM35, SM36, SM38, SM43, SM44, SM46, SM47, SM49, SM51, SM52, SM53, TIG22, TIG29, TIG60, TIG81, TIV08, TIV13, TIV14, TIV15, TIV17, TIV18, TIV21, TIV23, TIV24, TIV30, TIV31, TIV32, TIV33, TIV37, TIV38, TIV40, TIV46, TIV51, TIV54, TIV59, TIV63, TIV66, TIV67, TIV68, TIV71, TIV73, TIV74, TIV75, TIV76, TIV78, TIV80, TIV82, TIV83, TIV88, TIV91, TIV93, TIV94, 4820, 6137, 6155

Site modifiers for atypical conditions

TEM Map Code	Site Series Name	CWHxm1 Site Series
CWHxm1/HK	**Western hemlock–Douglas-fir–Oregon beaked moss**	**01**

HK	typic	HKkv	cool aspect; very shallow soil	HKgs	gully, shallow soil
HKs	shallow soil	HKw	warm aspect		
HKsw	shallow soil; warm aspect	HKhs	hummocky; shallow soil		
HKk	cool aspect	HKv	very shallow soil		
HKks	cool aspect; shallow soil	HKvw	very shallow soil; warm aspect		

TEM Map Code	Site Series Name	CWHdm Site Series
CWHdm/HM	**Hw - Flat moss**	**01**

HM	typic	HMkv	cool aspect; very shallow soil	HMgs	gully, shallow soil
HMs	shallow soil	HMw	warm aspect	HMn	fan
HMsw	shallow soil; warm aspect	HMhs	hummocky; shallow soil		
HMk	cool aspect	HMv	very shallow soil		
HMks	cool aspect; shallow soil	HMvw	very shallow soil; warm aspect		

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
DC	**Douglas-fir—Shore pine—Cladina**	**02**

SITE DESCRIPTION

The Dougals-fir-Shore pine-Cladina unit was commonly mapped, generally occurring on water-shedding ridge crests and convex upper slopes with very thin till or bedrock outcrops. Douglas-fir and shore pine were dominant in the canopy, with more pine occurring where soil conditions were driest. Canopy cover was sparse (20-40%), with much of the forest floor exposed. Dominant shrubs included salal and dull Oregon-grape. Shore pine and regenerating canopy species were frequent associates that occupied the shrub layer. Bedrock and shallow substrates were often covered by *Cladina* lichen species and dominant mosses including step moss, juniper haircap moss, curly heron's bill-moss, broom moss and red-stemmed feather moss.

Assumed modifiers: j, m, r, s (CWHxm1/DC); **j, r, s** (CWHdm/DC)

SITE CHARACTERISTICS

Elevation (m)	0-650
Slope (%)	5-65
Aspect (°)	999
Surficial material	Mv, Mx
Drainage	r
SMR	0
SNR	A (B)

Plots:
H1978A, H1994, I1889, I1894, JCV18, JCV37, JCV38, JCV43, JCV52, JCV57, JCV59, JCV60, JCV62, JCV63, JCV74, JCV75, JCV76, JCV77, JCV78, JCV80, JCV81, JCV93, JCV99, JCV100, JCV101, JCV106, JCV108, JCV113, JCV114, JCV116, JCV117, JCV121, JCV123, JCV157, SM1, SM10, SM12, SM27, SM41, SM50, TIV10, TIV57, TIV62, TIV64, TIV70, TTV001

Site modifiers for atypical conditions

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
DC	**Douglas-fir—Shore pine—Cladina**	**02**

DCk	cool aspect	DCv	very shallow soil
DCkv	cool aspect; very shallow soil	DCvw	very shallow soil; warm aspect
DCh	hummocky	DCvz	very shallow soil; very steep warm aspect
DChv	hummocky; very shallow soil	DCw	warm aspect

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
DS	**Douglas-fir—Western hemlock—Salal**	**03**

SITE DESCRIPTION

The Douglas-fir – Western hemlock – Salal sites occurred on well-drained, nutrient very poor to medium upper slopes, typically on warm aspects. Substrate was generally till of various depths, infrequently co-occurring with colluvium. The canopy closure of structural stage 4-5 stands was dense (often greater than 50%), opening up with succession. Dominant tree species included Douglas-fir, western redcedar and western hemlock. Regeneration of hemlock tended to be abundant in the understorey, with little Douglas-fir regeneration, reflecting the low shade tolerance of Douglas-fir and its mineral seedbed requirement. Salal formed dense thickets and was a constant dominant in the shrub layer, with little other plant cover except dull Oregon grape as a frequent associate. Step moss, Oregon beaked-moss, electrified cat's tail moss and curly heron's bill mosses were common in the bryophyte layer.

Assumed modifiers: d, m, w

SITE CHARACTERISTICS

Elevation (m)	0-650
Slope (%)	5-60
Aspect (°)	variable
Surficial material	M (C)
Drainage	w-r
SMR	1-2
SNR	A-C

Plots:
H1870A, H2020, I1905A, JCV115, JCV118, JCV119, 4843, SM28, SM30, SM33, SM34, TIV06, TIV11, TIV20, TIV48

Site modifiers for atypical conditions

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
DS	**Douglas-fir—Western hemlock—Salal**	**03**

DSv	very shallow soil
DSk	cool aspect
DSks	cool aspect; shallow soil
DSs	shallow soil
DSjs	gentke slope; shallow soil

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
DF	**Douglas-fir—Sword fern**	**04**

SITE DESCRIPTION

The Douglas-fir – Sword fern ecosystems were mapped on well drained upper to mid-slopes with variable thicknesses of till and colluvium, typically of coarser texture than sites supporting site series 03. Douglas-fir was the most common canopy dominant, but western hemlock was a frequent associate in all canopy layers. Grand fir was an infrequent associate. Shrubs occupied low to moderate cover (15-30%), with dull Oregon-grape, red huckleberry, common snowberry, and trailing blackberry constant associates. Sword fern dominated the herb layer, with relatively few other species. The bryophyte layer was dominated by Oregon beaked moss.

Assumed modifiers: d, j, m (CWHxm1/DF); **d, m** (CWHdm/DF)

SITE CHARACTERISTICS

Elevation (m)	0-650
Slope (%)	25-70
Aspect (°)	variable
Surficial material	M
Drainage	w
SMR	1-2
SNR	C-E

Plots:
I1782, JCG133, JCV148, SM19, SM37, TIG56

Site modifiers for atypical conditions

TEM Map Code		Site Series Name		CWHxm1/CWHdm Site Series	
DF		**Douglas-fir—Sword fern**			**04**
DFw	warm aspect	DFkv	cool aspect; very shallow soil	DFgw	gully; warm aspect
DFsw	shallow soil; warm aspect	DFvw	very steep cool aspect; shallow soil	DFn	fan
DFk	cool aspect	DFs	shallow soil	DFhk	hummocky; cool aspect
DFks	cool aspect; shallow soil	DFv	very shallow soil		

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
RS	**Western redcedar—Sword fern**	**05**

SITE DESCRIPTION

The Western redcedar – Sword fern ecosystem was very commonly mapped mid to lower slopes with well to moderately well-drained soils derived from till and occasionally colluvium. Western redcedar, western hemlock, grand fir, and Douglas-fir were frequent, represented in all canopy layers. Coarse woody debris was often moderately abundant to abundant on these sites. The understorey was dominated by swordfern, with variable amounts of salal, and occasionally dull Oregon-grape in the shrub layer. The herb layer featured the dominant species sword fern and bracken fern, occasionally with spiny wood fern and vanilla-leaf.

Assumed modifiers: d, m

SITE CHARACTERISTICS

Elevation (m)	0-650
Slope (%)	5-70
Aspect (°)	285-135 (135-285)
Surficial material	M, C
Drainage	w-m
SMR	3-4
SNR	D (E)

Plots:
H1986A, I1753, JCG04, JCG09, JCG22, JCG48, JCG54, JCG130, JCG131, JCG137, JCG143, JCV11, JCV23, JCV24, JCV25, JCV26, JCV29, JCV30, JCV34, JCV42, JCV45, JCV46, JCV47, JCV51, JCV73, JCV98, JCV139, JCV140, JCV144, JCV162, SM25, SM26, TIG05, TIG42, TTIG84, TI01, TIV02, TIV12, TIV16, TIV25, TIV35, TIV41, TIV43, TIV47, TIV49, TIV50, TIV52, TIV53, TIV65, TIV72, TIV85, TIV89, TIV92, TIV96, TIV97, TIV98, 6143, 6156

Site modifiers for atypical conditions

TEM Map Code		Site Series Name		CWHxm1/CWHdm Site Series	
RS		**Western redcedar—Sword fern**			**05**
RSj	gentle slope	RSks	cool aspect; shallow soil	RSkv	cool aspect; very shallow soil
RSjs	gentle slope; shallow soil	RSs	shallow soil	RSqs	gully; shallow soil
RSw	warm aspect	RSsw	shallow soil; warm aspect	RSqk	gully; cool aspect
RSk	cool aspect	RSvw	very shallow soil; warm aspect	RSqw	gully; warm aspect
RSg	gully	RSkv	kool aspect; very shallow soil	RSn	fan

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
HD	**Western hemlock—Western redcedar—Deer fern**	**06**

SITE DESCRIPTION	SITE CHARACTERISTICS	
The Western hemlock – Western redcedar – Deer fern site was uncommon in Howe Sound, but tended to develop on lower slopes with moderately to imperfectly drained soils derived from till. Douglas-fir and western hemlock were the most abundant tree and constant dominant, with lesser amounts of frequent associates western redcedar and grand fir. Bigleaf maple and red alder were often present in seral stands. Diagnostic species deer fern was infrequent in these stands. The understorey featured salal, salmonberry, and dull Oregon-grape in the shrub layer, with sword fern, bracken dominants in the herb layer. Occasionally spiny wood fern and lady fern also occurred. The moss layer was dominated by Oregon beaked moss with lesser amounts of coastal leafy moss. **Assumed modifiers: d, j, m**	**Elevation (m)**	0-650
	Slope (%)	5-25
	Aspect (°)	variable
	Surficial material	M
	Drainage	w-m
	SMR	5-6
	SNR	A-C

No photo available	Plots: JCV05, JCV153, SM4, SM8, SM11, SM13, SM42, SM45, SM48, TIG87

Site modifiers for atypical conditions

TEM Map Code		Site Series Name		CWHxm1/CWHdm Site Series
HD		**Western hemlock—Western redcedar—Deer fern**		**06**
HD	typic	HDh	hummocky	
HDs	shallow soil			
HDw	warm aspect			
HDsw	shallow soil; warm aspect			

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
RF	**Western redcedar—Foamflower**	**07**

SITE DESCRIPTION

The Western redcedar - Foamflower ecosystems occurred on moisture-receiving toe slopes, some seepage sites, and level sites with thick relatively rich, moderately well to imperfectly drained soils. Western redcedar was often associated in the semi-open canopy with constant associates western hemlock, red alder, grand fir and bigleaf maple; Douglas-fir was infrequent to absent on most RF sites. Shrubs included dense cover of the dominant species salmonberry and thimbleberry. Herbs also occupied a high cover proportion, with lady fern, spiny wood fern, foamflower, vanilla-leaf and small-flowered rush typically present in varying amounts on most sites. Step moss, curly heron's-bill moss, lanky moss and Oregon-beaked moss was dominant in the bryophyte layer.

Assumed modifiers: d, j, m

SITE CHARACTERISTICS

Elevation (m)	0-650
Slope (%)	0-35
Aspect (°)	variable
Surficial material	M
Drainage	m
SMR	5-6
SNR	D-E

Plots:

H1753, I1870A, JCG65, JCG142, JCV96, JCV145, JCV105, SM39, SM40, TIG09, TIG26, TIG39, TIG61, TIV04, TIV55, TIV86, TIV90, TIV95

Site modifiers for atypical conditions

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
RF	**Western redcedar—Foamflower**	**07**

RFw	warm aspect	RFks	cool aspect; shallow soil	RSgw	gully; warm aspect
RFk	cool aspect	RSn	fan	RSgs	gully; shallow soil
RFs	shallow soil	RSg	gully	RSgk	gully; cool aspect
RFsw	shallow soil; warm aspect				

TEM Map Code	Site Series Name	CWHxm1 Site Series	
SS	**Sitka spruce—Salmonberry**		**08**
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
Sitka spruce - Salmonberry high bench site series was infrequently mapped in the study area. Fluvial materials and landscape position contribute to highly productive, moderately-well drained sites with relatively open canopies (more open as stands age) Sitka spruce was not commonly found in the study area; broadleaf species including black cottonwood, red alder and bigleaf maple were dominant, with varying amounts of frequent associate western redcedar. Shrubs were highly variable in cover and diversity, with salmonberry and thimbleberry dominating, and less abundant associates' Pacific ninebark, red-osier dogwood, cascara, red elderberry, bitter cherry, and Pacific crabapple. Herbs also varied, with relatively low cover compared to shrubs. The common associate species were vanilla-leaf, lady fern, sweet-cicely, and false lily-of-the-valley. Coastal leafy moss was a common colonizer on woody substrate. **Assumed modifiers: a, d, j, m**		**Elevation (m)**	0-650
		Slope (%)	5-15
		Aspect (°)	variable
		Surficial material	F
		Drainage	m
		SMR	5-6
		SNR	C-E
No photo available	Plots: I1761, SM15		

No site modifiers mapped for atypical conditions

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series	
CD	**Black Cottonwood—Red-osier dogwood**	**09**	
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
These deciduous dominated floodplain ecosystems occupy medium bench active floodplains and are limited in occurrence to large creeks and rivers in Howe Sound. The black cottonwood – red-osier dogwood shrub-dominated floodplain ecosystem is frequently inundated and supports species adapted to periodic flooding or high water tables. The vegetation on mid bench floodplains are usually composed of black cottonwood, red alder, willows, red-osier dogwood and salmonberry. Herb species include piggy-back plant, lady fern, and common horsetail. It occurred adjacent to other rich sites such as western redcedar – foamflower sites (mapcode: RF). **Assumed modifiers: a, d, j, m** (CWHxm1/CD); **a, j, m** (CWHdm/CD)		**Elevation (m)**	0-650
		Slope (%)	5-15
		Aspect (°)	variable
		Surficial material	F
		Drainage	m
		SMR	5-6
		SNR	C-E
No photo available	Plots: N/A		

No site modifiers mapped for atypical conditions

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series	
LS	**Shore pine - Sphagnum**		**11**
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
The shore pine – peat moss unit represents a forested bog ecosystem that is uncommon in the Howe Sound study area. This ecosystem occurred adjacent to bogs and open water wetlands at all elevations. Sweet gale and salal are common on these sites. Other shrubs include Labrador tea, western bog-laurel, and peat mosses. These ecosystems consist of very open redcedar and pine trees with a wide variety of herbs and mosses. **Assumed modifiers: d, j, p**		**Elevation (m)** **Slope (%)** **Aspect (°)** **Surficial material** **Drainage** **SMR** **SNR**	0-650 <10 n/a Ov, Ob i - p 6 - 7 A - C
No photo available	Plots: N/A		

No site modifiers mapped for atypical conditions

TEM Map Code	Site Series Name	CWHxm1/CWHdm Site Series
RC	**Western redcedar—Sitka spruce—Skunk cabbage**	**12**

SITE DESCRIPTION

Western redcedar – Sitka spruce – Skunk cabbage are rich, moist to wet sites which occurred in moisture-receiving depressions with fine to medium soils, possibly including a minor component of organics. Western redcedar was a typical dominant with lesser amounts of associated Sitka spruce, red alder, bigleaf maple, and grand fir on the margins. Alder abundance decreased with stand age. Sites often had abundant moderate to large woody debris. Shrubs observed included salmonberry, thimbleberry, and occasionally salal on hummocks. The most common associate species were slough sedge, lady fern, deer fern, and skunk cabbage. Bryophytes associated with this site series were coastal and large leafy moss and slender beaked moss.

Assumed modifiers: d, j, m

SITE CHARACTERISTICS

Elevation (m)	0-650
Slope (%)	0-10
Aspect (°)	variable
Surficial material	M (0)
Drainage	p
SMR	7
SNR	C-E

Plots:

H1981C, TIV03, TIV36, TIV45, 6154, 6169

No site modifiers mapped for atypical conditions

Ecosystems in the CWHvm2 subzone[1]

TEM Map Code	Site Series Name	CWHvm2 Site Series
AB	**Western hemlock–Grand fir–Blueberry**	**01**

SITE DESCRIPTION	SITE CHARACTERISTICS	
The 01 site series in the CWHvm2 occurs typically on gentle to mid slopes on medium textured soils. Western hemlock occurs as the dominant trees species in association with Douglas-fir and western redcedar. The understory is well developed with salal as the dominant shrub and associates such as dull Oregon grape and red huckleberry. **Assumed modifiers: d, j, m**	**Elevation (m):**	>650
	Slope (%):	Variable
	Aspect (°):	Variable
	Surficial material:	M, F^{G}
	Drainage:	m-w
	SMR:	3-4
	SNR:	A-C

Site modifiers for atypical conditions

TEM Map Code		Site Series Name		CWHvm2 Site Series
AB	typic	ABks	cool aspect; shallow soil	
ABs	shallow soil	ABh	hummocky	
ABsw	shallow soil; warm aspect	ABw	warm aspect	
ABk	cool aspect	ABv	very shallow soil	

[1] No plot sampling occurred in the CWHvm2, therefore legend information is limited to general descriptions and mapped modifiers.

TEM Map Code	Site Series Name	CWHvm2 Site Series
LC	**Western hemlock—Shore pine—Cladina**	**02**

SITE DESCRIPTION	SITE CHARACTERISTICS	
The LC ecosystem was commonly mapped on water-shedding ridge crests and convex upper slopes with very thin till or bedrock outcroppings. Western and shore pine were dominant in the canopy, with more pine occurring where soil conditions were driest. Canopy cover appears to be sparse with much of the forest floor exposed. Dominant shrubs likely include salal and dull Oregon-grape. **Assumed modifiers: j, r, s**	**Elevation (m)**	>650
	Slope (%)	5-65
	Aspect (°)	999
	Surficial material	Mv, Mx
	Drainage	r
	SMR	0
	SNR	A (B)

Site modifiers for atypical conditions

TEM Map Code		Site Series Name		CWHvm2 Site Series
LCw	warm aspect	LCkv	cool aspect; very shallow soil	
LCk	cool aspect	LCh	hummocky	
LCv	very shallow soil			
LCvw	warm aspect; very shallow soil			

TEM Map Code	Site Series Name	CWHvm2 Site Series
HS	**Western hemlock—Western redcedar—Salal**	**03**

SITE DESCRIPTION	SITE CHARACTERISTICS	
The Western hemlock – Western redcedar–Salal sites were mapped on well-drained, nutrient very poor to medium upper slopes, typically on warm aspects. Dominant tree species included western redcedar and western hemlock. Salal was likely a constant dominant in the shrub layer, with dull Oregon grape as a frequent associate. **Assumed modifiers: j, m, s**	**Elevation (m)**	>650
	Slope (%)	5-60
	Aspect (°)	variable
	Surficial material	M, F^{G} (C)
	Drainage	w-r
	SMR	1-2
	SNR	A-C

Site modifiers for atypical conditions

TEM Map Code		Site Series Name	CWHvm2 Site Series
HS	typic		
HSh	hummocky		

TEM Map Code	Site Series Name	CWHvm2 Site Series
RS	**Western redcedar—Western hemlock—Sword fern**	**04**

SITE DESCRIPTION	SITE CHARACTERISTICS	
The Douglas-fir – Sword fern ecosystems were infrequently mapped occurring on well drained upper to mid-slopes with variable thicknesses of till and colluvium. Western hemlock is likely the most common canopy dominant, but recedar was a frequent associate in all canopy layers. Similar to the lower subzones shrubs likely include dull Oregon-grape, red huckleberry, common snowberry, and trailing blackberry. Sword fern dominates the herb layer, with relatively few other species. The bryophyte layer was dominated by Oregon beaked moss.	**Elevation (m)**	>650
	Slope (%)	25-70
	Aspect (°)	variable
	Surficial material	M, F^{G}
Assumed modifiers: d, m	**Drainage**	w
	SMR	1-2
	SNR	C-E

Site modifiers for atypical conditions

TEM Map Code	Site Series Name	CWHvm2 Site Series
RSj gentle slope	RSsw shallow soil; warm aspect	RSg gully
RSjs gentle slope; shallow soil	RSkv kool aspect; very shallow soil	RSqw gully; warm aspect
RSk cool aspect	RSks cool aspect; shallow soil	RSn fan
Rshs Hummocky; shallow soil		

TEM Map Code	Site Series Name	CWHvm2 Site Series
AF	**Grand fir—Western redcedar—Foamflower**	**05**

SITE DESCRIPTION	SITE CHARACTERISTICS	
The Grand fir - Western redcedar - Foamflower ecosystems were mapped on moisture-receiving toe slopes, some seepage sites, and level sites with thick relatively rich, moderately well to imperfectly drained soils. The AF site was also mapped in gully situations. It appears that Western redcedar was often associated in the semi-open canopy with constant associates western hemlock, red alder, grand fir and bigleaf maple; Douglas-fir was infrequent to absent on most RF sites. **Assumed modifiers: d, m**	**Elevation (m)**	>650
	Slope (%)	0-35
	Aspect (°)	variable
	Surficial material	M, F^{G}
	Drainage	m
	SMR	5-6
	SNR	D-E

Site modifiers for atypical conditions

TEM Map Code		Site Series Name		CWHvm2 Site Series
AFk	cool aspect	AFqs	gully; shallow soil	
AFjs	gentle slope; shallow soil	AFqk	gully; cool aspect	
AFg	gully			

TEM Map Code	Site Series Name	CWHvm2 Site Series
HD	**Western hemlock—Grand fir—Deer fern**	**06**

SITE DESCRIPTION	SITE CHARACTERISTICS	
The Western hemlock – Grand fir – Deer fern site was uncommonly mapped in Howe Sound, but likely occurred on lower slopes with moderately to imperfectly drained soils. Western hemlock is expected to be the most abundant tree and constant dominant, with lesser amounts of frequent associates western redcedar and grand fir. Bigleaf maple and red alder were often present in seral stands. **Assumed modifiers: d, m**	**Elevation (m)**	>650
	Slope (%)	5-25
	Aspect (°)	variable
	Surficial material	M
	Drainage	w-m
	SMR	5-6
	SNR	A-C

Site modifiers for atypical conditions

TEM Map Code		Site Series Name	CWHvm2 Site Series
HD	typic		
HDs	cool aspect		

TEM Map Code	Site Series Name	CWHvm2 Site Series	
AS	**Grand fir—Western redcedar—Salmonberry**		**07**
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
The AS ecosystem was mapped infrequently in the upper elevations of Howe Sound on moisture-receiving toe slopes, and seepage sites. Western redcedar was often associated in the semi-open canopy with constant associates western hemlock, red alder, grand fir and bigleaf maple. Shrubs included dense cover of the dominant species salmonberry and thimbleberry. **Assumed modifiers: d, j, m**		**Elevation (m)**	>650
		Slope (%)	0-35
		Aspect (°)	variable
		Surficial material	M, F^{G}
		Drainage	m
		SMR	5-6
		SNR	D-E

No site modifiers mapped for atypical conditions

TEM Map Code	Site Series Name	CWHvm2 Site Series	
YG	**Western redcedar-Yellow cedar - Goldthread**		**09**
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
The YG unit represents a forested bog ecosystem that is uncommon in the upper elevations of Howe Sound. This ecosystem occurred adjacent to bogs and nutrient-poor sites. Western redcedar and salal are common on these sites with herbs, such as deer fern, bunchberry, and fern-leaved goldthread. **Assumed modifiers: d, j, p**		**Elevation (m)**	>650
		Slope (%)	<10
		Aspect (°)	n/a
		Surficial material	Ov, Ob
		Drainage	i - p
		SMR	6 - 7
		SNR	A - C
No photo available	Plots: N/A		

Non-forested Terrestrial Ecosystems in Howe Sound

TEM Map Code	Site Unit	CWHxm1 & CWHdm Site Series
SC	**Cladina – Wallace's selaginella**	**00**

SITE DESCRIPTION

The Cladina – Wallace's selaginella ecosystem is a non-forested ecosystem occurring on shallow to very shallow soils typical of rock outcrops and warm, south facing aspects. Non-vascular flora dominates the unit with species such as *Cladina* species, hoary and common rock moss, sidewalk moss, and Wallace's selaginella. Field inspection revealed this community varied to include components of diverse vascular species such as stonecrops, and frequently contained low to moderate cover of introduced grass species on richer sites. The SC unit was often mapped in association with DC and RO units and was typically mapped as structural stage 1b.

Dominant species included Wallace's selaginella and broom moss, while associate species included arbutus, Douglas-fir, blue wildrye, long rock-moss, grey rock-moss, awned haircap moss, juniper haircap moss, early hairgrass, sweet vernalgrass, oceanspray, kinnikinnick, Columbia brome, and curly heron's-bill moss.

Assumed modifiers: j, m, r, v

SITE CHARACTERISTICS

Elevation (m)	All
Slope (%)	0-100
Aspect (°)	135-285 (varies)
Surficial material	R (Mx, $W^{G}x$)
Drainage	x
SMR	0-1
SNR	A-B

Plots:
H1984, H2010A, I1781A, I1877, I1888, I1905, I1909, JCV02, JCV14, JCV21, JCV44, JCV58, JCV156, JCV158, TTV005, TIV77, TIV79, TIV27

Site modifiers for atypical conditions

TEM Map Code		Site Association	CWHxm1 & CWHdm Site Series
SC		**Cladina—Wallace's selaginella**	**00**
SCh	hummocky		
SCw	warm aspect		
SCk	cool aspect		
SChs	hummocky; shallow soil		

Tem Map Code	Site Unit	CWHxm1 Site Series
AM	**Arbutus—Hairy manzanita**	**00**

SITE DESCRIPTION

These very xeric Arbutus – Hairy Manzanita sites occurred on coastal bluffs and water-shedding steep slopes directly on bedrock. Canopies were very open (<5%) with arbutus and occasionally shore pine dominant, rarely reaching past structural stage 4 with respect to structural development criteria. The shrub layer was dominated by hairy manzanita, arbutus regeneration, and occasionally Scotch broom. Herbs were typically sparse, but annuals may be evident in the spring, particularly graminoids, but comprising low (<20%) cover. The substrate was typically dominated almost completely by curly heron's-bill moss and, to a lesser extent, and on rock outcrops, foliose lichens.

Dominant vegetation included sweet vernalgrass, hairy Manzanita, shore pine, curly heron's-bill moss, hoary rock-moss, Douglas-fir, Alaska oniongrass, grey rock-moss and juniper haircap moss. Associate species included green sorrel and lesser green reindeer. Dominant vegetation included arbutus, curly heron's-bill moss, red-stemmed feathermoss, hairy Manzanita, western hemlock, Douglas-fir, Oregon beaked-moss and salal, with oceanspray as an associate species.

Assumed modifiers: j, r, s

SITE CHARACTERISTICS

Elevation (m)	0-50
Slope (%)	Variable
Aspect (°)	120-250
Surficial material	R
Drainage	r
SMR	1
SNR	A

Plots:

JCV15

No site modifiers mapped for atypical conditions

Wetland Ecosystems in CWHxm1, dm, and vm2 subzones

TEM Map Code	Site Association	CWHxm1 & CWHdm Site Series	
Wb50	**Labrador tea—Bog-laurel—Peat-moss bog**		
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
The Labrador tea – Bog-laurel – Peat-moss ecosystem is uncommon in Howe Sound. Wb50 sites occur in raised peatlands and closed basins with a stagnant watertable. These sites are characterized by moderate species diversity dominated by low ericaceous species such as Labrador tea, bog-laurel, and sweet gale. Peat-moss species dominate the ground layer with scattered acid-loving herbs. This bog ecosystem occurs on organic veneers of poorly developed peat. **Assumed modifiers: N/A**		**Elevation (m)**	150-650
		Slope (%)	0
		Aspect (°)	999
		Surficial material	Ov
		Drainage	p-v
		SMR	7
		SNR	D
No photo available	Plots: H1997B, H1983D		

No site modifiers mapped for atypical conditions

TEM Map Code	Site Association	CWHxm1 & CWHdm
Wf50	**Narrow-leaved cotton-grass—Peat-moss fen**	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Narrow-leaved cotton-grass—Peat moss sites are uncommon in Howe Sound. Wf50 sites are fen ecosystems dominated by cotton-grass and *Sphagnum* mosses but other species may also be prominent depending specific site conditions. Typically this fen occurs on organic soils which are less than 2 m thick. **Assumed modifiers: N/A**	**Elevation (m)**	All
	Slope (%)	0
	Aspect (°)	999
	Surficial material	Ob, Ov
	Drainage	p-v
	SMR	6-7
	SNR	C

No photo available	Plots: I1716

No site modifiers mapped for atypical conditions

TEM Map Code	Site Association	CWHxm1, CWHdm & CWHvm2
Wf52	**Sweet gale—Sitka sedge fen**	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Sweet gale—Sitka sedge sites are the most common wetland type in Howe Sound, but occur in a variety of landscape positions that are shallowly flooded during part of the year. Wf52 sites are characterized by low species diversity, dominated by sweet gale, Sitka sedge, and *Sphagnum* mosses. This fen ecosystem has a closed and dense thicket of sweet gale and hardhack. Sitka sedge dominates the herb layer. **Assumed modifiers: N/A**	**Elevation (m)**	All
	Slope (%)	0
	Aspect (°)	999
	Surficial material	Ob
	Drainage	p-v
	SMR	6-7
	SNR	C

No photo available	Plots: H1995, I1993C, I1768, I1993A, I1985, I1988, I1767

No site modifiers mapped for atypical conditions

TEM Map Code	Site Association	CWHxm1	
Wm50	**Sitka sedge—Hemlock-parsley marsh**		
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
The Sitka sedge – Hemlock-parsley marsh ecosystem is very uncommon in the study area. Sitka sedge is always present with a number of other forb and grass species, depending on the substrate and amount of flowing water. Wm50 sites develop on organic veneers and marine deposits along streams and ponds near coastal waters. From plot data dominant species included common rush, small-flowered forget-me-not and slough sedge, while associate species included common green peat-moss and hardhack. **Assumed modifiers: N/A**		**Elevation (m)**	<60
		Slope (%)	0
		Aspect (°)	999
		Surficial material	$W^{G}b$
		Drainage	p
		SMR	8
		SNR	C
No photo available	Plots: N/A		

No site modifiers mapped for atypical conditions

TEM Map Code	Site Association	CWHxm1	
Em03	**Seashore saltgrass**		
SITE DESCRIPTION		**SITE CHARACTERISTICS**	
The Seashore saltgrass ecosystem was found adjacent to mudflat sediments on Gambier Island. Seashore saltgrass communities are often found with Em02 sites. Em03 ecosystems occur on fine-textured, poorly drained tidal sediments in brackish estuaries. The dominant species are seashore saltgrass, glasswort and sea milkwort, with few other species. **Assumed modifiers: N/A**		**Elevation (m)**	<10
		Slope (%)	0
		Aspect (°)	999
		Surficial material	Ov, Wp
		Drainage	p
		SMR	7
		SNR	B-C
No photo available	Plots: I1785A, I1785B		

No site modifiers mapped for atypical conditions

Anthropogenic and Non-Vegetated/Sparsely Vegetated Map Units of the CWHxm1, CWHdm and CWHvm2

TEM Map Code	Site Unit Name	CWHxm1
BE	Beach	

SITE DESCRIPTION

Beach units are characterized by sorted sediments reworked by wave action. All beach units were mapped along the ocean edge, beach units were not present along fresh water bodies. This unit is typically void of vegetation and consists of either sand or coarse fragments such as gravels, cobbles and stones, with scattered driftwood, seaweed and various washed up items along the shoreline.

SITE CHARACTERISTICS

Elevation (m):	0-3 m
Slope (%):	Variable
Aspect (°):	Variable
Surficial material:	W
Drainage:	n/a
SMR:	n/a
SNR:	n/a

Plots: N/A

TEM Map Code	Site Unit Name	CWHxm1
CF	Cultivated Field	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Cultivated fields are non forested, open areas that are subject to agricultural practices including plowing, fertilization, and non native crop production which often results in long-term soil and vegetation changes. Cultivated fields are common throughout Howe Sound on lower elevations. The typical structural stage for cultivated fields is graminoid-dominated (2b). Small islands of forest occur in fields, as do narrow shrub dominated riparian channels and scattered large trees.	**Elevation (m):**	50-150
	Slope (%):	<15
	Aspect (°):	Variable
	Surficial material:	M, W^G
	Drainage:	i - w
	SMR:	2-6
	SNR:	B-D

No photo available	Plots: N/A

TEM Map Code	Site Unit Name	CWHxm1
GC	Golf Course	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Only one golf course was mapped in Howe Sound. Golf courses are characterized by flat to gently rolling grass-covered throughways and open areas for playing golf. The fairways are typically separated by isolated rows or patches of trees and ponds.	**Elevation (m):**	Variable
	Slope (%):	<15
	Aspect (°):	Variable
	Surficial material:	M, W^G
	Drainage:	n/a
	SMR:	n/a
	SNR:	n/a

No photo available	Plots: N/A

TEM Map Code	Site Unit Name	CWHxm1 & CWHdm
GP	**Gravel Pit**	

SITE DESCRIPTION

Gravel pits are areas of exposed soil through the commercial removal of sand and gravel.

SITE CHARACTERISTICS

Elevation (m):	Variable
Slope (%):	Variable
Aspect (°):	Variable
Surficial material:	W^G, F^G, A
Drainage:	n/a
SMR:	n/a
SNR:	n/a

Plots: TTV008

TEM Map Code	Site Unit Name	CWHxm1
IN	**Industrial**	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Industrial sites were added as an anthropogenic unit due to the requirement to address sites that were dominated by industrial development namely, pulp and paper, lumber mills, oil/gas refineries and so on. These units are characterized by a high degree of ground disturbance; concrete parking lots, large commercial buildings, work yards and other specialized industry infrastructure.	**Elevation (m):**	Variable
	Slope (%):	Variable
	Aspect (°):	Variable
	Surficial material:	n/a
	Drainage:	n/a
	SMR:	n/a
	SNR:	n/a

No photo available	Plots: N/A

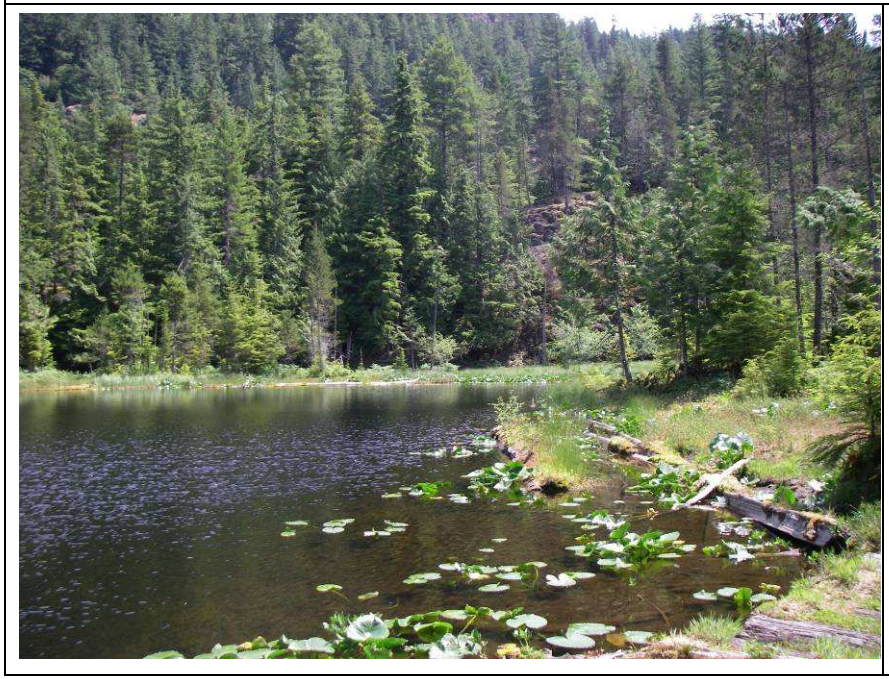
TEM Map Code	Site Unit Name	CWHxm1, CWHdm & CWHvm2
LA	**Lake**	

SITE DESCRIPTION

A lake is a naturally occurring body of water, greater than 2 m deep. Several lakes occur within the mapping area such as Grafton, Gambier, Kilarney, and Josephine.

SITE CHARACTERISTICS

Elevation (m):	Variable
Slope (%):	0
Aspect (°):	999
Surficial material:	n/a
Drainage:	n/a
SMR:	n/a
SNR:	n/a



Plots: N/A

TEM Map Code	Site Unit Name	CWHxm1
MU	Mudflat Sediment	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Mudflat sediment is a flat plain-like area dominated by fine textured sediments. These areas were mapped at the interface of salt and fresh water, namely active channel sediment located at the mouth of a creek as they drain into saltwater bays.	**Elevation (m):**	Variable
	Slope (%):	Variable
	Aspect (°):	Variable
	Surficial material:	n/a
	Drainage:	n/a
	SMR:	n/a
	SNR:	n/a

No photo available	Plots: N/A

TEM Map Code	Site Unit Name	CWHxm1, CWHdm & CWHvm2
OW	**Shallow Open Water**	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Shallow open water is a wetland class composed of permanent, shallow (less than 2 m at midsummer levels), standing water that has less than 10% surface cover of emergent vegetation (plants rooted in the bottom). Open water with more than 10% surface cover of emergent vegetation are classified as marsh wetlands.	**Elevation (m):**	Variable
	Slope (%):	0
	Aspect (°):	999
	Surficial material:	n/a
	Drainage:	n/a
	SMR:	n/a
	SNR:	n/a

No photo available	Plots: I1993B, I1986

TEM Map Code	Site Unit Name	CWHxm1
RE	Reservoir	

SITE DESCRIPTION

A reservoir is an artificial basin created by the impoundment of water behind a human-made structure such as a dam, berm, dyke, or wall.

SITE CHARACTERISTICS

Elevation (m):	Variable
Slope (%):	0
Aspect (°):	999
Surficial material:	n/a
Drainage:	n/a
SMR:	n/a
SNR:	n/a

Plots: SM7

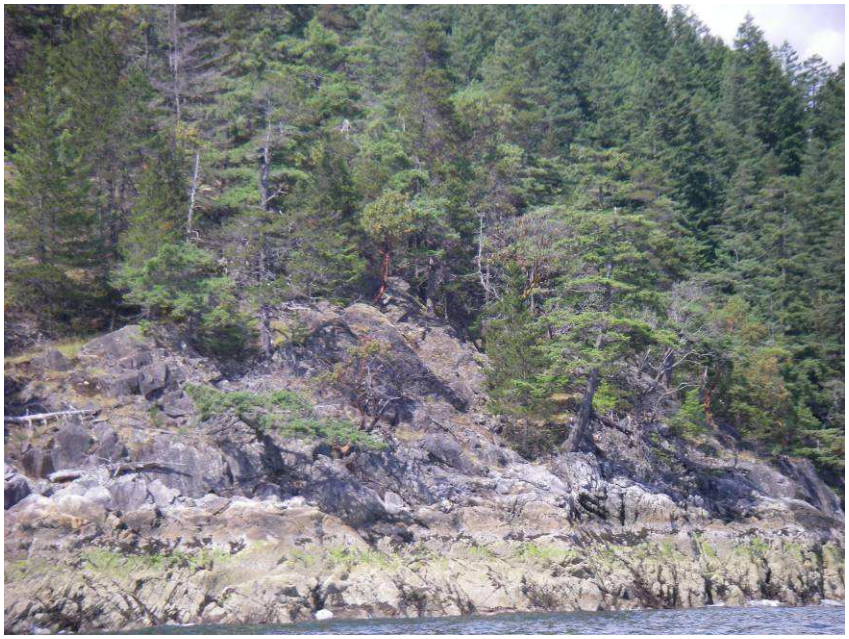
TEM Map Code	Site Unit Name	CWHxm1, CWHdm & CWHvm2
RO	Rock Outcrop	

SITE DESCRIPTION

Rock outcrops are bedrock outcroppings with little soil development and sparse vegetation cover. Rock outcrops can be steep such as the one in the photo below or gentle such as those found along ridges. Often rock outcrops are associated with dry 02 sites and SC units. Most importantly SEI units classified as coastal bluffs were mapped as rock outcrops with 02 and SC sites intermixed. These coastal rock outcrops begin at the waters edge and extend to the upper elevations of the study area.

SITE CHARACTERISTICS

Elevation (m):	Variable
Slope (%):	Variable
Aspect (°):	Variable
Surficial material:	R
Drainage:	x-r
SMR:	n/a
SNR:	n/a



Plots:
JCV61, JCV79, JCV109, JCV112, JCV120, JCV129, JCV155, JCV160, JCV164, SM22, SM23, SM24, TIV19, TIV69, TTV002, TTV004, TTV006

TEM Map Code	Site Unit Name	CWHxm1, CWHdm & CWHvm2
RW	**Rural**	

SITE DESCRIPTION

Rural areas are characterize by areas that have residences and other human development scattered and intermingled with forests, range, farm land, cultivated fields or native vegetation. Rural areas are very common in the lower elevations of Howe Sound and often form the dominant polygon component. Minor components include cultivated fields, zonal forests and shrubby riparian creek draws.

SITE CHARACTERISTICS

Elevation (m):	Variable
Slope (%):	Variable
Aspect (°):	Variable
Surficial material:	n/a
Drainage:	n/a
SMR:	n/a
SNR:	n/a

Plots:
JCV122, JCV146, JCV161, TTV003, TTV007

TEM Map Code	Site Unit Name	CWHxm1
RZ	Road Surface	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Road surfaces are not typically large enough to be mapped in Howe Sound. Defined as areas cleared and compacted for the use of vehicles.	**Elevation (m):**	Variable
	Slope (%):	Variable
	Aspect (°):	Variable
	Surficial material:	n/a
	Drainage:	n/a
	SMR:	n/a
	SNR:	n/a
No photo available	Plots: N/A	

TEM Map Code	Site Unit Name	CWHxm1
UR	**Urban**	

SITE DESCRIPTION	SITE CHARACTERISTICS	
Urban units are not common in Howe Sound where the landform is man-modified and drainage is no longer applicable. Urban areas occurred in town centers such on Bowen Island.	**Elevation (m):**	Variable
	Slope (%):	Variable
	Aspect (°):	Variable
	Surficial material:	n/a
	Drainage:	n/a
	SMR:	n/a
	SNR:	n/a

No photo available	Plots: N/A